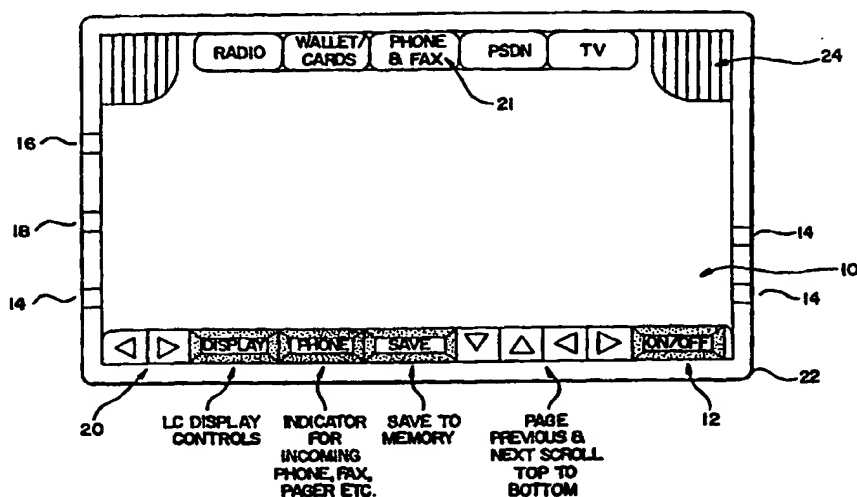




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>G06F 17/60, 1/00, 15/21, 3/00, 15/30,</b> <b>G06K 5/00</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 99/34314</b> <b>(43) International Publication Date:</b> 8 July 1999 (08.07.99)
<b>(21) International Application Number:</b> PCT/US98/27856 <b>(22) International Filing Date:</b> 30 December 1998 (30.12.98)  <b>(30) Priority Data:</b> 09/000,895 30 December 1997 (30.12.97) US  <b>(71)(72) Applicant and Inventor:</b> PITRODA, Satyan, G. [US/US]; 1480 Golden Bell Court, Downers grove, IL 60515 (US).  <b>(74) Agents:</b> SHEKLETON, Gerald, T. et al.; Welsh & Katz, Ltd., 22nd floor, 120 S. Riverside Plaza, Chicago, IL 60606 (US).		<b>(81) Designated States:</b> BR, CA, CN, IL, IN, JP, MX, RU, SG, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** UNIVERSAL ELECTRONIC COMMUNICATIONS CARD**(57) Abstract**

A universal electronic communications card is capable of serving as a number of different credit cards, bank cards, identification cards, employee cards, medical cards and the like, as well as communicate with information providers, such as telephone and computer networks, television, and radio broadcast. The universal electronic communication card includes a housing adapted to fit in a pocket or purse, an input interface, storage elements, a processor (40), a display (10), a transaction communications interface (14), and an information provider interface. The information provider communications interface may include a public switched telephone network interface (52), such as a central office line interface, a wireless telephone interface, a pager interface, or a facsimile interface. The information provider communication interface may also comprise a packet switched data network interface (50), such as an e-mail interface or an Internet interface (52). The information provider communication interface may also comprise a radio frequency interface, such as a television (48) or radio interface (56).

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## **UNIVERSAL ELECTRONIC COMMUNICATIONS CARD**

### **BACKGROUND**

This invention relates to a universal electronic communications card ("UEC card").

Most people carry a substantial number of cards, including multiple credit cards, insurance cards, drivers licenses, airline cards, check identification cards, ATM cards, and employee identification cards. Carrying a substantial number of such cards is inconvenient. Financial accounting associated with these cards related to paying bills, keeping track of accounts, budgeting, planning and the like, is manual, cumbersome, time consuming, and difficult to manage and maintain. Further, such cards are replaced on a periodic basis. Thus, a substantial amount of plastic must be used to make the cards, paper must be used to mail the cards to users, and a substantial amount of paper and plastic is eventually thrown away, resulting in waste, degradation of the environment, and a loss of money.

In addition to the aforementioned disadvantages to conventional cards, information, and the management of information, has grown increasingly important. Common tools to receive and manage information include voice communications, including land-based and wireless telephones, and voice mail messaging, data communications, including computer network, e-mail, facsimile, pager communications, and broadcast information sources, such as radio and television. Accordingly, one aspect of the invention is to provide a UEC card that includes electronic transaction capabilities and electronic communication management capabilities.

## SUMMARY

One aspect of the invention is to provide a universal electronic communication card ("UEC card") for storing, transmitting, and receiving information for a plurality of service institutions and communication providers. "Communication providers," as used  
5 herein, include public switched telephone networks ("PSTNs"), including land-based and wireless telephone and paging service providers, packet switched data networks ("PSDNs"), including internet service providers, e-mail service providers, local area networks ("LANs"), and wide area networks ("WANs"), and radio frequency information providers, such as television and radio broadcasters.

10 U.S. Patent No. 5,590,038, which is incorporated by reference, and pending application Serial No. 08/708,555, filed September 6, 1996, also incorporated by reference, disclose a Universal Electronic Transaction Card ("UET card") having electronic transaction capabilities (*i.e.* storing, transmitting, and receiving information) with respect to a plurality of service institutions. The present UEC card may include the  
15 electronic transaction capabilities as disclosed in the UET card.

As used herein, the term "service institution" includes any business, service, governmental agency, or other entity, which issues any type of card commonly carried by an individual for the purposes of identification, credit transactions, bank transactions, licensing, registration or similar functions. The information stored, transmitted, or  
20 received by the UEC card may include personal information of the user of the UEC card.

It may also include account information for each service institution with which the user has an account. As used herein, the term "account information" includes any identifying designation which identifies the UEC card user with a service institution, including but not limited to the user's name, address, phone number, social security number, credit card  
25 account numbers, bank account numbers, license numbers, identification numbers, insurance account numbers, medical identification numbers, and the like. The information stored, transmitted, or received by the UEC card may also include transactional information for accounts with service institutions in which the UEC card user has an account. As used herein, the term "transactional information" includes  
30 information relating to one or more individual financial transactions, such as credit card transactions, medical treatment payments, insurance payments, and the like. The transactional information includes various transaction details that may appear on a paper

receipt for any given financial transaction, such as a subtotal, a tip, if any, a transaction total, the date and place of the transaction, and the user's signature.

In another embodiment of the invention, the information stored, transmitted, and received by the UEC card includes promotional information. As used herein,

- 5 "promotional information" includes advertisements, electronic facsimiles of coupons, and usage incentives such as "frequent flier miles", cash back rebates, or any of various incentive programs offered by credit card issuers.

In another embodiment of the invention, the information stored, transmitted and received by the UEC card includes stored cash value information. As used herein,

- 10 "stored cash value information" includes information relating to a cash balance which may be stored on the UEC card, credits or debits to the cash balance, a traveler's checks balance which may be stored on the UEC card, credits or debits to the traveler's check balance and graphical images of various denominations of currency and traveler's checks. In this embodiment, the UEC may be used as an electronic equivalent to cash or  
15 traveler's checks. Electronic cash or traveler's checks are inherently safer than conventional counterparts, however, due to the security features of the UEC.

- The universal electronic communication card includes housing means for housing inputting means, memory means, service institution communications means, information provider communication means, display means, and processing means, the housing  
20 means adapted to fit in a pocket or purse; inputting means for inputting information, including personal information for the user, account information for a plurality of service institutions in which the user has an account, and transactional information for each service institution for which account information exists, into the memory means; memory means for storing information, including personal information for the user, account  
25 information for a plurality of service institutions in which the user has an account, and transactional information for each service institution for which account information exists; service institution communications means for electronically communicating information, including personal information, account information, and transactional information, with service institutions; information provider communication means for  
30 electronically communicating information with information providers; display means for displaying information for a plurality of service institution accounts, including personal information, account information, and transactional information; processing means for

processing information, including personal information, account information, and transactional information; and means for providing and storing electric power. The display means may further include means for displaying information for at least one information provider.

5       The information provider communication means may comprise a public switched telephone network interface, such as a central office line interface, a wireless telephone interface, a pager interface, or a facsimile interface. The information provider communication means may also comprise a packet switched data network interface, such as an e-mail interface or an Internet interface. The information provider communication  
10       means may also comprise a radio frequency interface, such as a television or radio interface.

          In one embodiment, the UEC card includes a touch-sensitive display which is large enough to display a visibly perceptible replica of a credit card and a visibly perceptible replica of the user's signature. Menus can be provided on the touch sensitive  
15       display to enable the user to select one service institution from a group of service institutions in order to proceed with a transaction using the card. Further, the touch-sensitive display may be provided with multiple levels of menus, including at least one level enabling the user to select from groups of service institutions, and at least one other level enabling the user to select a particular service institution. In addition, a graphic  
20       image of a service institution may be displayed when the service institution is selected by a user, along with the user's name and account number. Alternatively, instead of a touch-sensitive display, the UEC card may be provided with a pointing device.

### DESCRIPTION OF THE DRAWINGS

25       Figure 1 is a front view of one embodiment of a universal electronic communications card in accordance with the present invention.

          Figure 2 is a block diagram of one embodiment of a universal electronic communications card of the present invention.

          Figure 3 is a flow chart of one embodiment of a universal electronic  
30       communications card of the present invention.

          Figure 4 illustrates a graphical user interface ("GUI") for a transaction card of a universal electronic communications card of the present invention.

Figure 5 illustrates a GUI for a pager of a universal electronic communications card of the present invention.

Figure 6 illustrates a GUI for a PSDN interface of a universal electronic communications card of the present invention.

5 Figure 7 illustrates a GUI for a television of a universal electronic communications card of the present invention.

Figure 8 illustrates a GUI for a radio of a universal electronic communications card of the present invention.

## 10 DETAILED DESCRIPTION

The embodiment of the Universal Electronic Communications (UEC) Card shown in Figure 1 consists of a liquid crystal display 10, a power switch 12, interface contacts 14, RF antenna connection 16, telephony contacts 18, volume and picture controls 20, plastic cover and enclosure 22, speaker 24. The size of the UET card may be  
15 around 3 1/2" x 2 1/2", which is similar to the normal plastic credit card in use today. It is designed to be carried in the wallet and/or packets. Power is provided to the UEC card by one or more conventional disposable or rechargeable batteries (not shown).

In one embodiment of the UEC card, the liquid crystal display 10 is touch sensitive, and the user may control the functions of, and enter information into, UEC  
20 card by touching highlighted areas 26 of the liquid crystal display 10. In another embodiment, the liquid crystal display 10 is not touch sensitive. The user may input information by using buttons, a mouse, or other pointing device (not shown), which may be in the form of a trackball built into the UEC card.

In the illustrated embodiment, the interface contacts 14 are provided to read/write  
25 to and from the memory and to charge the battery through an external unit, such as a communications interface unit. In another embodiment, optical, such as infra red, or radio frequency based wireless transmit and receive units may be employed in lieu of, or in addition to, the interface contacts 14.

In the illustrated embodiment, the RF antenna connection 16 is provided to allow  
30 a user to connect an external antenna to enhance reception of information from information providers, such as television and radio broadcasters, wireless telephone service providers, and PCS service providers. However, an internal antenna is also

contemplated. The telephony contacts 18 are provided for connection to land based telephone circuits, including conventional tip-and-ring subscriber lines. The speaker 24 is provided for reproduction of various sounds related to information service provides, including, for example, radio and television sounds, and voices associated with telephone communications. The speaker 24 may also be used to provide an audible tone indicating a low battery condition or an appointment reminder.

Referring to Fig. 2, internal hardware and software blocks are provided. In addition to the previously described liquid crystal display 10 and the speaker 24, the illustrated embodiment of the UEC card includes a display controller 30, and an advanced digital signal processing based master processor 40, such as a reduced instruction set chip ("RISC") processor as the micro controller. The master processor 40 is connected to a DMA based flow controller 42 and associated electronic memory 44. Additional components include a television interface 48, a packet switched data network interface 50, a public switched telephone network interface 52, a transaction card interface 54, and a radio interface 56.

The "interfaces" on the UEC Card are generally complete, fully-functional circuits capable of operation without additional external circuitry. For example, the transaction card interface 54 may comprise some or all of the UET card disclosed in U.S. Patent No. 5,590,038.

The radio interface 56 uses conventional standards for the reception and demodulation of AM and FM radio broadcasts. The radio interface 56 is coupled to the speaker 24. The television interface 48 uses conventional standards for the reception and demodulation of television broadcasts, and is coupled to the LCD display controller 30 and the speaker 24.

The packet switched data network interface 50 provides, for example, Internet and E-mail processing capabilities. The packet switched data network interface 50 includes conventional compression and decompression circuits which enable the switching of data packets over a packet switched network. This interface will allow the UEC Card, with known search and browser software, to act as an Internet (or any PSDN) browser, enabling the user to send and receive data and e-mail.

The public switched telephone network interface 52 provides conventional telephone communication capabilities, such as land-based and wireless telephone



communications, including voice mail messaging, as well as facsimile communications. The public switched telephone network interface 52 includes front end central office protection, balancing and hybrid circuits. The public switched telephone network interface may also include a cellular telephone transceiver.

5 In the embodiment of the UEC card illustrated in Fig. 2, a plurality of interface processing circuits 60, each including supporting RAM and ROM, are connected in parallel with the master processor 40. Also connected in parallel with the plurality of interface processing circuits 60 is a Bar Code Reader 58. Each interface processing circuit 60 is associated with an individual interface, such as the television interface 48,  
10 the packet switched data network interface 50, the public switched telephone network interface 52, the transaction card interface 54, and the radio interface 56. The UEC Card is configured in parallel configuration, with the master processor 40 controlling and coordinating of the plurality of interface processing circuits 60. Additionally, each of the plurality of interface processing circuits 60 may interact directly with the other interface  
15 processing circuits 60. In addition to the embodiment illustrated in Fig. 2, it is also contemplated that all processing may be integrated into a single microprocessor circuit.

Each of the plurality of interface processing circuits transmits, receives and processes information corresponding to its respective interface, and passes the information on to the master processor 40. The master processor 40 is the bridge  
20 between the user interface, such as the touch sensitive display and/or speaker, and the various information and transaction interfaces.

With reference to Fig. 3, when the UEC Card is switched on, the user will be prompted to enter in the user ID along with the password and a signature which can be verified. On proper authorization, the UEC Card will display all the options, i.e. the  
25 Card, Phone and Fax, Radio, Television, PSDN or data connection. This data includes all packet switched data, including voice and image or video transmitted over any PSDN. The user may select the desired feature and the touch sensitive screen will change accordingly, displaying the selected interfaces. For example, Figure 4 illustrates a graphical user interface ("GUI") for a transaction card interface, Figure 5 illustrates a  
30 GUI for a pager interface, Figure 6 illustrates a GUI for a PSDN interface, Figure 7 illustrates a GUI for a television, and Figure 8 illustrates a GUI for a radio.

The TV feature, on selection, will be responsible for decoding the incoming RF

signal and consequently reproducing the image and sound on the liquid crystal display 10 and speakers. On selection of the phone and fax feature, the user friendly touch sensitive display will allow the user to place or receive a phone call using the existing cellular or mobile telephone system, through the land and fiber optic lines. The user may also configure the UEC Card to save voice messages whereby a caller will be prompted to leave a voice message, the UEC Card storing a finite number of messages along with the time, date and caller's ID. The user may also send and receive facsimile transmissions using the UEC Card. The same interface will also receive and display an incoming page, if the user has the service.

The PSDN or Internet feature will allow the user to use the UEC Card as a browser for a computer network, such as the Internet, to send and receive e-mail, and to download and upload files using PSDN'S. The PSDN interface will also allow the user to connect the UEC Card with any LAN or WAN which supports existing packet switching protocols. On selection of the PSDN feature, the PSDN interface will establish the connection with the PSDN, will generate the headers and packets as per the supported protocols, will compress this information or the data packets and transmit them over the PSDN. This information could be data or packetized voice and video or image information for "real time" multimedia applications over the PSDN'S. The interface will also decompress incoming data packets reconstruct the original information and reproduce it through the liquid crystal display 10 and speaker 24 on the UEC Card.

On selection of the Radio feature, the radio interface will receive the incoming RF signal and give the user the option of selecting the various AM and FM channels supported. The RF signal is decoded and reproduced by the interface using the speaker 24.

The Bar Code Reader 58 is used to communicate with known POS terminals. Additionally, a conventional magnetic stripe may be included in the UEC Card to communicate through known POS terminals and databanks. The transaction card interface 54 may include metallic contacts or optical transceivers for exchange of information with dedicated POS terminals. For example, an optical transceiver may include an LED or laser light source and corresponding sensors. The advantage of including at least one conventional POS interface, such as the Bar Code Reader 58 or the magnetic stripe, is compatibility with existing POS terminals, thereby facilitating

acceptance of the UEC card in the marketplace. Also, including at least one dedicated interface, such as metallic contacts or optical transceivers, would provide for more efficient communication of information as dedicated POS terminals are introduced by various service institutions.

**I CLAIM:**

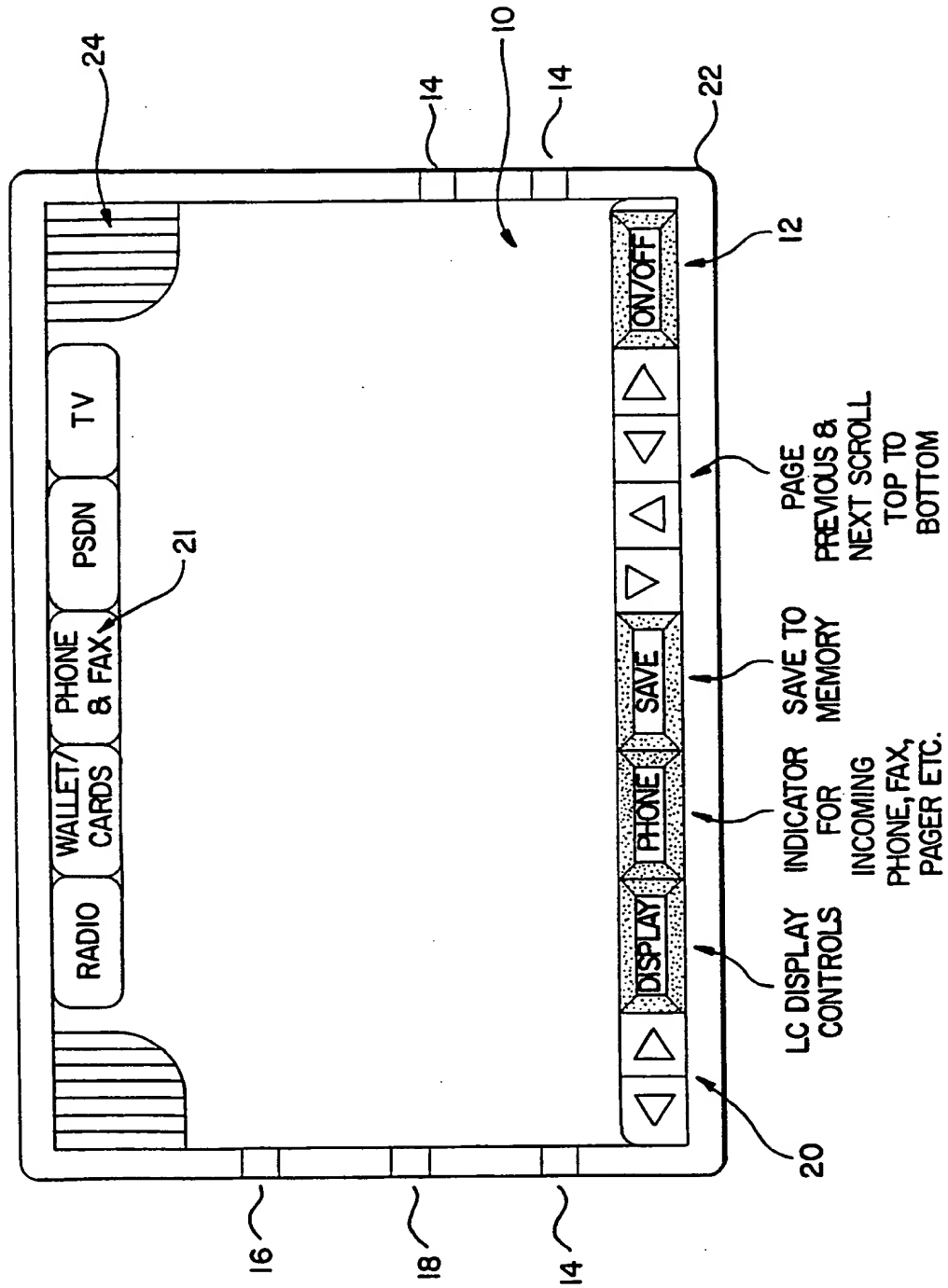
1. A universal electronic communication card associated with a user for storing, transmitting, and receiving information for a plurality of service institutions and communication providers, comprising:
  - a. housing means for housing inputting means, memory means, service  
5 institution communications means, information provider communication means, display means, and processing means, the housing means adapted to fit in a pocket or purse;
  - b. inputting means for inputting information, including personal information  
10 for the user, account information for a plurality of service institutions in which the user has an account, and transactional information for each service institution for which account information exists, into the memory means;
  - c. memory means for storing information, including personal information for  
15 the user, account information for a plurality of service institutions in which the user has an account, and transactional information for each service institution for which account information exists;
  - d. service institution communications means for electronically  
communicating information, including personal information, account  
information, and transactional information, with service institutions;
  - 20 e. communication provider communication means for electronically communicating information with communication providers;
  - f. display means for displaying information for a plurality of service  
institution accounts, including personal information, account information,  
and transactional information;
  - 25 g. processing means for processing information, including personal information, account information, and transactional information; and
  - h. means for providing and storing electric power.
2. The universal electronic communication card of claim 1 in which the display means includes means for displaying information for at least one communication provider.

3. The electronic communication card of claim 1 in which the communication provider communication means comprises a public switched telephone network interface.
4. The electronic communication card of claim 3, in which the public switched telephone network interface includes a central office line interface.
5. The electronic communication card of claim 3, in which the public switched telephone network interface includes a wireless telephone interface.
6. The electronic communication card of claim 3, in which the public switched telephone network interface includes a pager interface.
7. The electronic communication card of claim 3, in which the public switched telephone network interface includes a facsimile interface.
8. The electronic communication card of claim 1 in which the communication provider communication means comprises a packet switched data network interface.
9. The electronic communication card of claim 8 in which the packet switched data network interface includes an e-mail interface.
10. The electronic communication card of claim 8 in which the packet switched data network interface includes an Internet interface.
11. The electronic communication card of claim 1 in which the communication provider communication means comprises a radio frequency interface.
12. The electronic communication card of claim 11 in which the radio frequency interface includes a radio interface.
13. The electronic communication card of claim 12 in which the radio interface is coupled to a speaker.
14. The electronic communication card of claim 11 in which the radio frequency interface includes a television interface.
15. The electronic communication card of claim 14 in which the television interface is coupled to a speaker and the display means.
16. The universal electronic transaction card of claim 1 in which the display means concurrently displays a plurality of categories of information.

17. A universal electronic communication card associated with a user for storing, transmitting, and receiving information for a plurality of service institutions and communication providers, comprising:
- a. a housing adapted to fit in a pocket or purse;
  - 5 b. an input interface;
  - c. storage elements, connected to the input interface;
  - d. a processor, connected to the storage elements and the input interface;
  - e. a display, connected to the processor;
  - f. a transaction communications interface, connected to the processor; and
  - 10 g. at least one information provider interface, connected to the processor.
18. The universal electronic communication card of claim 17 wherein the information provider communications interface comprises a public switched telephone network interface.
19. The universal electronic communication card of claim 17 wherein the information provider communication means comprises a packet switched data network interface.
20. The universal electronic communication card of claim 17 wherein the information provider communication interface comprises a radio frequency interface.

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FIG. 1



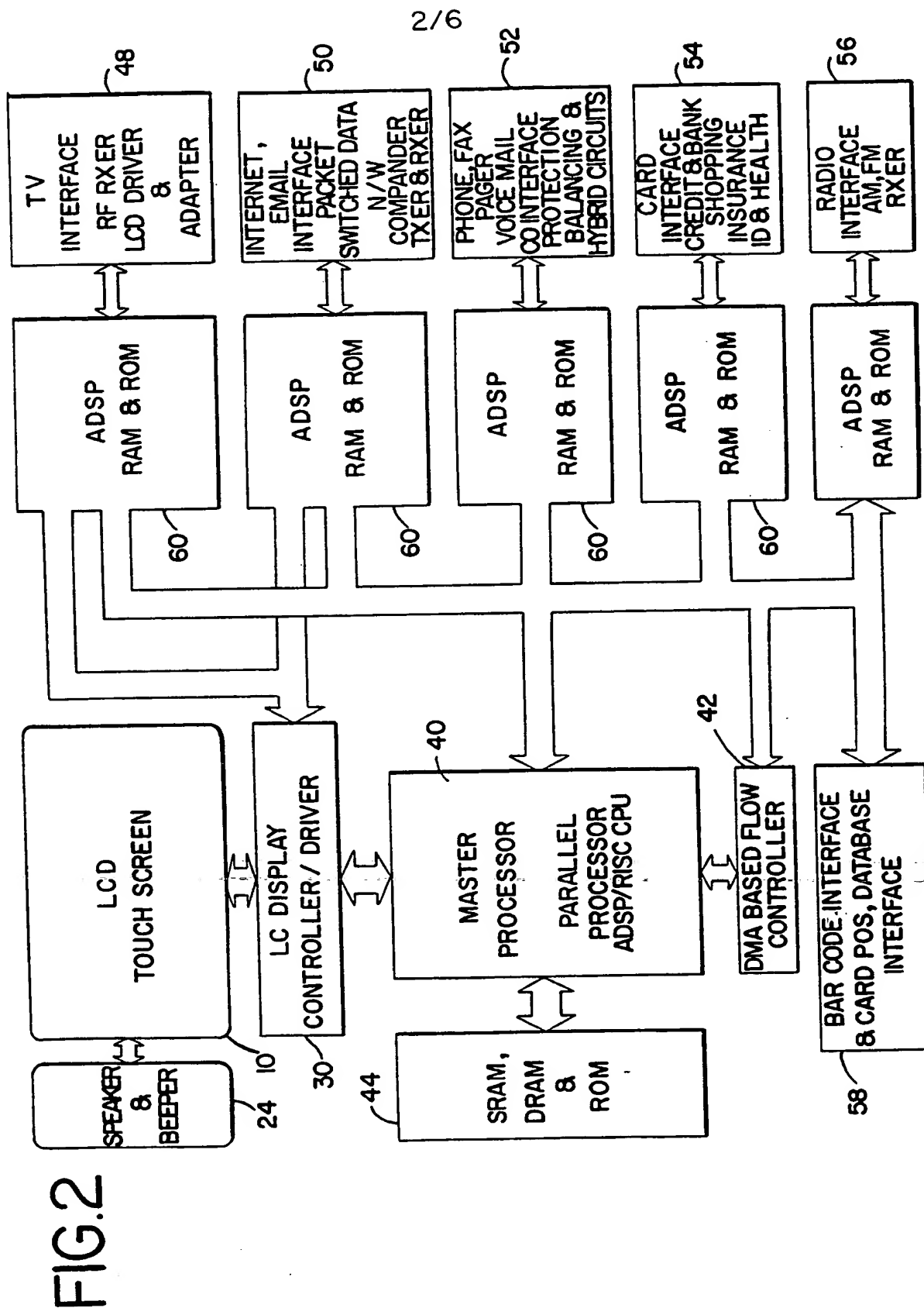




FIG.3

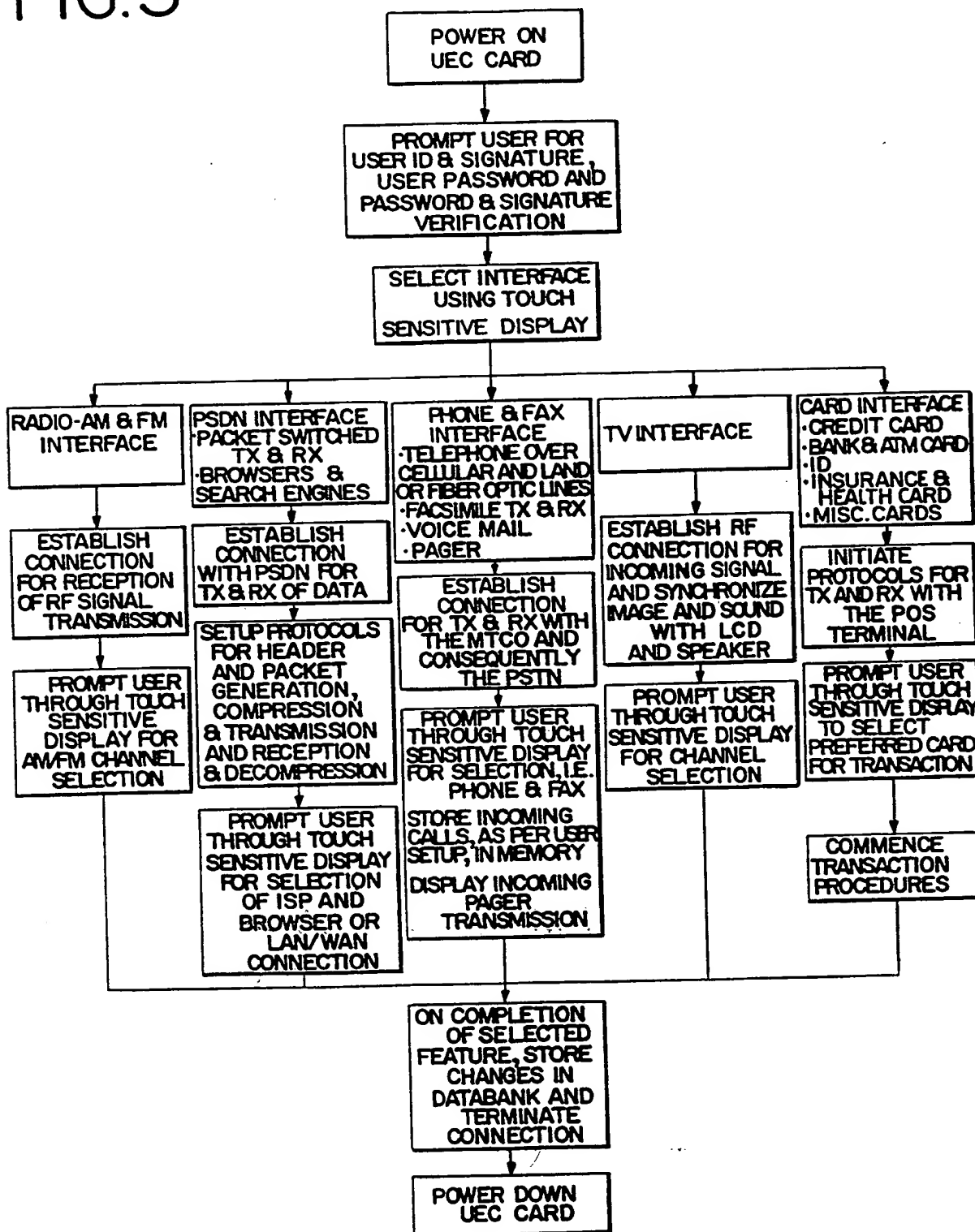
3/6  
SYSTEM FLOW CHART

FIG. 4

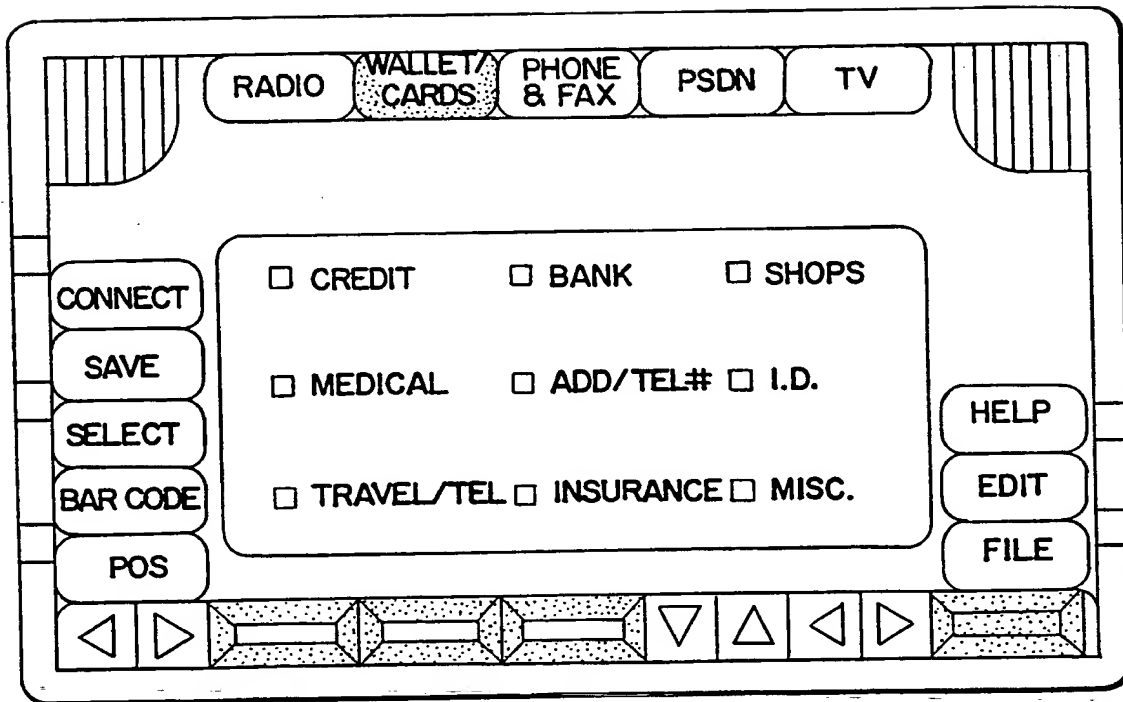


FIG. 5

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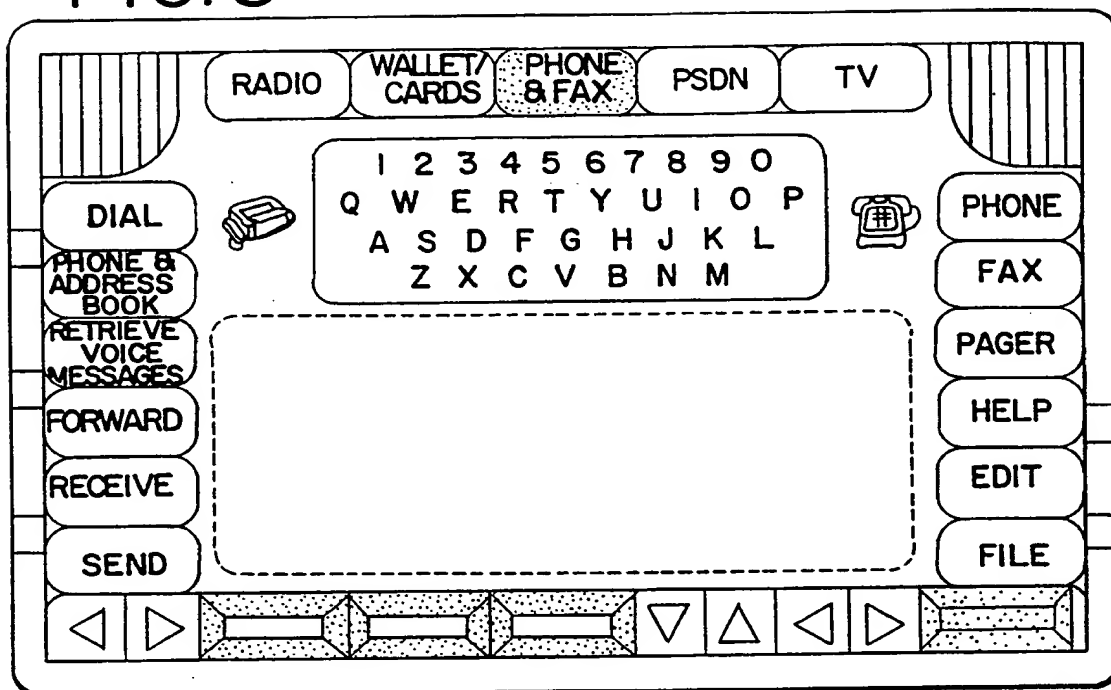


FIG. 6

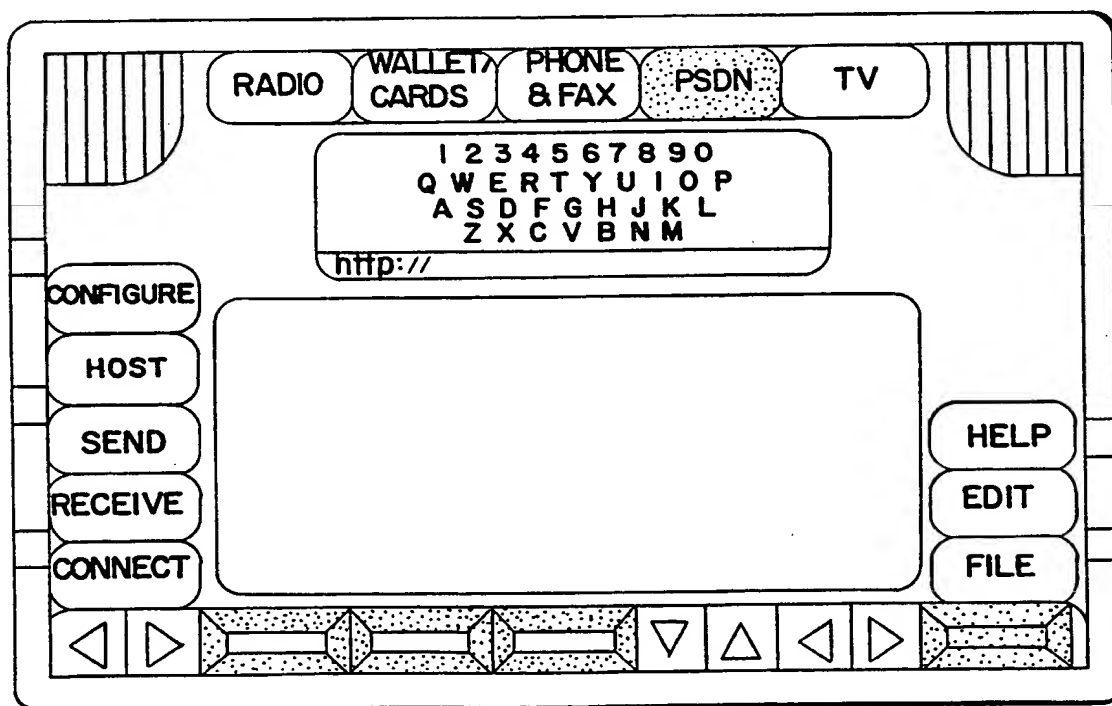


FIG. 7

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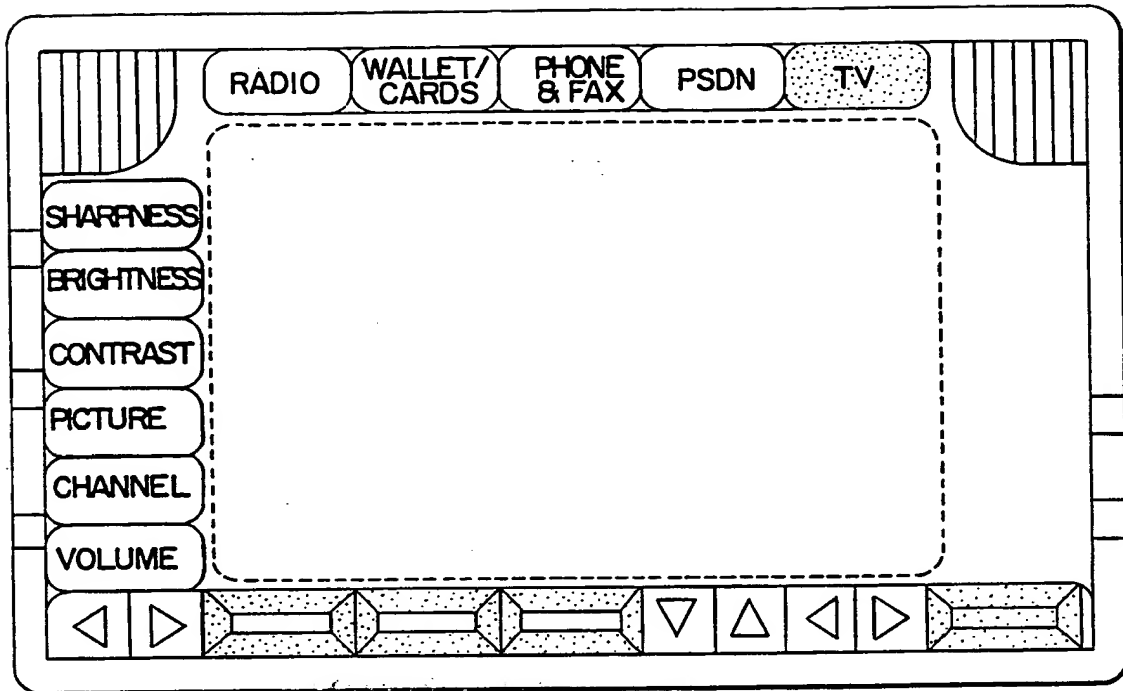
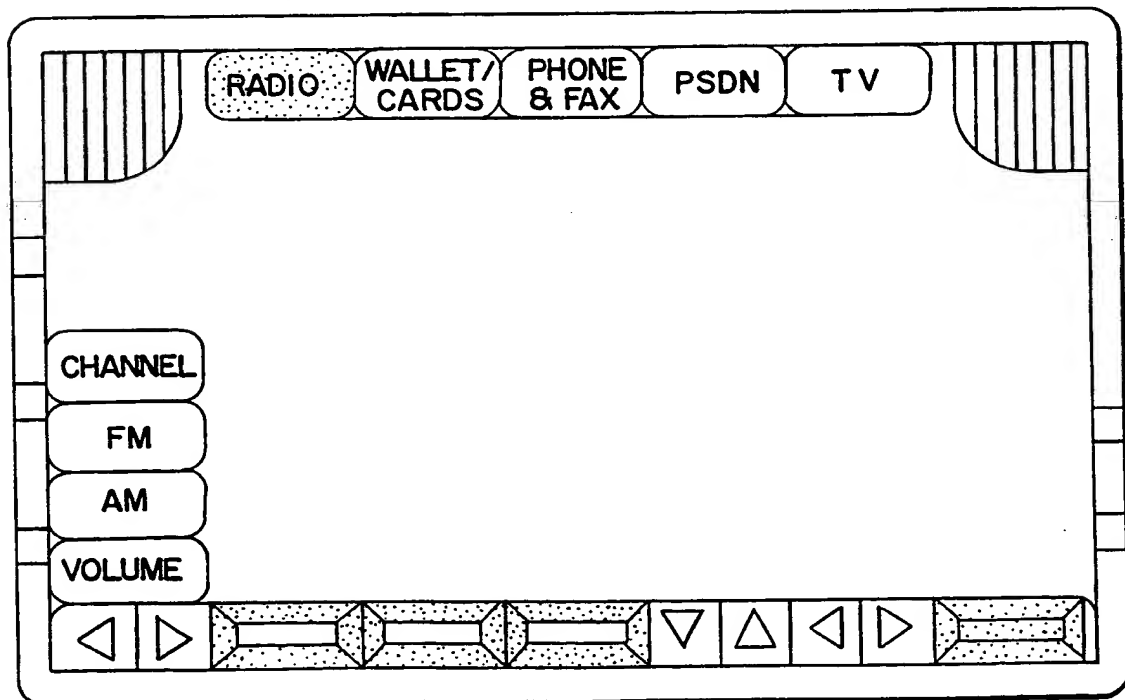


FIG. 8



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/27856

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 17/60, 1/00, 15/21, 3/00, 15/30; G06K 5/00

US CL :705/41, 40, 43, 39, 4; 235/380, 492; 340/825.33, 711/170

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/41, 40, 43, 39, 4; 235/380, 492; 340/825.33, 711/170

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

smart card, storing, transmitting, receiving, information

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,833,595 A (IJIJIMA) 23 May 1989, col. 3, lines 6-41	1-20
A	US 5,017,766 A (TAMADA et al) 21 May 1991, col. 2, lines 1-62.	1-20
A	US 4,305,059 A (BENTON) 08 December 1981, col. 5, lines 20-59	1-20
A	US 4,341,951 A (BENTON) 27 July 1982, col. 5, lines 6-49.	1-20
A	US 4,705,211 A (HONDA et al) 10 November 1987, col. 2, lines 18-61.	1-20
A	"SMARTTV, 01 March 1997, pages 1-5.	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

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